



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

DOGM
MINERALS PROGRAM
FILE COPY

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February 23, 1989

Mr. Eric York
General Manager
Moab Salt, Inc.
P.O. Box 1208
Moab, Utah 84532

Dear Mr. York:

Re: Mine and Reclamation Plan Review, Cane Creek Potash Mine,
M/019/005, Grand County, Utah

You will find summarized in this letter our completed review of the Cane Creek Mining and Reclamation Plan (MRP), and of the most recent, May 18, 1988, Moab Salt submittal. Also, you will find, in Attachment A, a summary of the remaining concerns, which must be addressed at your site. These concerns evolved from a meeting held between this Division and the Bureau of Water Pollution Control (BWPC) February 1st. The concerns have been broken into categories, for which either this Division will take the lead or BWPC will take the lead, for review.

We have determined that the plan, is conceptually acceptable. However, there are some questions that still need to be addressed before we can proceed with a tentative approval. The principal concern the Division has, deals with postmine land uses. It is our opinion that what you have proposed for postmine land use, over specific portions of the site, needs more support. Are such land uses as the freshwater lake and recreational lodging at the site feasible? The postmine land use has a direct bearing on the amount of reclamation surety, which will be required from Moab Salt.

The topic of reclamation surety is discussed further below, along with other subjects. We have labeled each section with headings from our new rules (approved December 1, 1988) for easier reference. To eliminate confusion, the old regulation section numbers are given in parentheses next to the new. Also, for your use, we have enclosed, with this letter, a copy of our new regulations.

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R613-004-113-Reclamation Surety (R613-1M-5)

1. Page 14-17, Reclamation Cost Estimates - Texasgulf submitted a reclamation bond estimate of \$13,470,000 in the Mining and Reclamation Plan received September 1, 1987.

DOGM COMMENT: This estimate was determined using the 1986 Means Handbook and does not include the demolition of the majority of surface buildings, pads and roads. Texasgulf proposed a recreational use of these facilities, including a hotel, restaurant, museum, bowling alley, etc.

Should the Division accept this post-mining use, the escalated bond amount, including a ten percent contingency, will total \$17,617,000 in 1994 dollars.

If, on the other hand, the Division requires complete reclamation of all surface facilities, the escalated bond amount, including a ten percent contingency, is \$23,402,000 in 1994 dollars. Please see the attached copy of the Division's reclamation estimate reflecting some of these costs.

The above estimate does not include the reclamation of the brine lake, which would add to the reclamation costs considerably. The reclamation of the brine lake and dam may become a very real obligation on the part of the operator. Unless such a facility can be operated and maintained by another responsible party after Moab Salt has left the site, the State cannot allow it to remain.

We would like to suggest that Moab Salt representatives and Division personnel schedule a meeting to discuss the proposed postmine land uses, and the associated form and amount of surety. The type of postmine land use proposed by Moab Salt will require input from the County, and other government agencies such as: State Parks and Recreation, State Health, Water Rights, and possibly the National Park Service.

R613-004-111- Reclamation Practices (R613-1M-10)

1. Page 11-26, Section 11.C.15.b., Salt Storage Area -
Subsurface leachate resulting from the proposed final leaching of this area is to flow into the fault lying east of the site. The three (3) existing TP wells are to intercept the seepage and pump it back into the brine storage lake.

DOGM COMMENT: How was/will it be confirmed that all seepage is being intercepted and returned to the storage lake by the fault and corresponding wells? Will well pumping be continued once the fresh water lake is established? Will the existing TP wells be used indefinitely to recycle subsurface seepage back into the reservoir? If so, will the pumping capacity be sufficient to handle probable increases in subsurface seepage due to increased water volume and an elevated head within the reservoir? Will the seepage rates change as a result of a conversion from salt water to fresh water? What will be the ultimate disposition of these wells? Prior to abandonment, these wells must be plugged according to Rule R613-004-108. If construction of these wells has been approved by the State Division of Water Rights, then they should be plugged as required under their regulations.

All monitoring, observation and test wells, which have not been plugged and abandoned by the operator, should be registered and/or approved (as appropriate) by the Division of Water Rights. The operator is advised to contact the Price area office to confirm that all wells are appropriately registered.

2. Page 11-10, Section 11.B.5, Roads & Drill Pads - The operator proposes to leave specific roads and drill pads as part of a proposed recreational park postmining land use.

DOGM COMMENT: This may be a valid postmining land use, however appropriate state, local and/or county approvals must be verified before the Division can grant a variance for not reclaiming these areas. Until these approvals are obtained, the Division must assume a worst case scenario and include these areas as part of the operator's reclamation responsibility.

3. Page 11-11, 11.B.6, Landfill - A waste disposal area (landfill), is proposed for the salt storage area upon cessation of mining operations.

DOGM COMMENT: All appropriate approvals and permits must be obtained from State, local and/or county authorities prior to actual construction and use of this facility. This land use cannot be made part of the approved reclamation plan until the operator can confirm that the onsite landfill is a sound proposal. Until such time, the Division must assume that these materials will require offsite disposal, and will require the operator to adjust the reclamation estimate accordingly.

4. Page 11-22 & 23, Section 11.C.13, Salt Storage Area Reclamation - The operator indicates that all land previously covered by storage salt, with the exception of the area covered by the brine storage lake, will be reclaimed. The brine storage lake area is to be converted to a fresh water lake as part of a future recreation park.

DOGM COMMENT: This may be a valid postmining land use, however the cooperation, concurrence and/or approval of appropriate federal, state, county, and local authorities will be required. Many questions will likely be asked which may require additional detailed technical and engineering work of the operator before this proposal can actually be implemented.

Before the Division can consider approving this proposed postmining land use and grant a variance to Rule M-10(13) Dams, for the brine/salt storage dam, reasonable assurance must be provided that this land use is indeed feasible and likely to occur. Otherwise, the Division must require appropriate reclamation plans for the dam and the brine storage lake bottom, which will increase the reclamation costs for this operation.

5. Page 12-3, Revegetation Plan for the "Raw Salt Storage Area" - The text indicates that natural precipitation will rinse the salt from the rock walls and soil deposits. The operator may use water to leach additional salt out of the soil deposits in the disposal area.

DOGM COMMENT: This proposal conflicts with the plan as outlined on page 11-23, Section 11.C.13, Salt Storage Area Reclamation. Are these areas the same? If so, please clarify which proposal will be used for reclamation of the area.

6. Rule M-10(3), Impoundments - The operator has requested a variance to leave the earthen impoundments associated with the water treatment plant and sewer treatment facility upon completion of mining operations. The intent is to supply Dead Horse Point State Park and Canyonlands Island in the Sky with culinary water.

DOGM COMMENT: This is an acceptable proposal, provided the operator can provide written confirmation from the identified parties, expressing their interest and concurrence in pursuing this option with Moab Salt.

7. Rule M-10(8), Drainages - The operator has requested a variance from the reclamation standard for reestablishing certain premining drainage patterns on the mine property.

DOGM COMMENT: The Division concurs with the justification provided by the operator. This variance is granted with the provision that those small dams and catch ponds, not having an acceptable postmining land use, will be reclaimed and the affected areas left self-draining and non-impounding.

8. Page 12-2 to 5, Revegetation Plan - The operator proposes to leach several areas of the site with fresh irrigation water, to remove sodium and potassium salts from the soil. The operator indicates that the salt will be leached to within three feet of the soil surface. The leaching will continue until the soil SAR values are below 14 and the EC values below 8 mmhos/cm. In this section the operator also specifies the seed mix to be used at final reclamation.

DOGM COMMENT: Leaching the salts to a depth where they do not interfere with plant growth is the most feasible approach in this situation. Because of the high sodium content of the soil, the operator should consider amending the soil with calcium sulfate, calcium chloride, ammonium nitrate, lime sulfur, or combinations of the above. Without such amendments, sodium in the soil may not be adequately removed. This is especially true if the clay content of the soil is high, which can be determined by soil analysis.

Because of the danger of upward migration of harmful salts, it would be wise to test the leaching and revegetation procedure before full scale implementation. The Division will request that the operator establish vegetation test plots. The test plots should be established on salt contaminated soil that has been leached. The operator may want to experiment with various soil amendments and plant mixtures to determine the best final reclamation procedure.

In addition to an evaluation of the revegetation properties of the leached soils, the Division will ask the operator to evaluate salt mobilization in the vadoze zone. The same test plots could be used for this type of evaluation. The purpose of such an evaluation would be to prove that none, or an insignificant amount of salts will escape to ground water after the proposed reclamation procedure has been completed.

The operator is advised to establish several test plots in areas which will be representative of the conditions on site at final reclamation. The Division will require that the operator establish these test plots by late fall of 1989. We will also require that the test plots have, at a minimum, a five year life expectancy.

Adequate demonstration of salt leaching will be tied into future bond release. Experimentation on test plots will help insure success on a larger scale.

The Division has reviewed the operator's proposed seed mixture, and makes the following recommendations:

<u>Species</u>	<u>lbs/acre</u>
Thickspike Wheatgrass (Agropyron dasystachyum)	1
Streambank Wheatgrass (Agropyron riparium)	2
Galleta Grass (Hilaria rigida)	1
Indian Ricegrass (Oryzopsis hymenoides)	2.5

Alkali sacaton (Sporobolus airoides)	.5
Yellow Sweetclover (Melilotus officinalis)	1
Desert Globemallow (Sphaeralcea grossulariaefolia)	1
Shadscale (Atriplex confertifolia)	1
Fourwing Saltbush (Atriplex canescens)	2
Rubber Rabbitbrush (Chrysothamnus nauseosus)	.5
Winterfat (Eurotia lanata)	2
California Buckwheat (Eriogonum fasciculatum)	1
Total = 15.5 lbs/ac	

The seeding rates given are for drill seeding only. The rates should be doubled if broadcast seeding. These species have been chosen because of their tolerance to drought and salt. The operator should use these species for test plot purposes. The Division will require that the operator commit to using this mix, or derivation of this mix, and not the one on Table 12.1 of the plan. If it turns out through experimentation that some of these species will do poorly in this area, they can be dropped from the list at a later date.

R613-004-112-Variances

The operator has requested several variances. These are found on pages 15-1 to 2 in the MRP. The variances, to a large degree are related to the postmine land uses (yet to be approved). All but one of them cannot be approved at this time. The variances are listed below with the DOGM comment following.

1. M-10(3) Impoundments - see section R613-004-111 #6, of this letter. This variance cannot be approved at this time.

2. M-10(7) Roads and Pads - see section R613-004-111 #2, of this letter. The Division cannot approve this variance at this time.
3. M-10(8) Drainages - see section R613-004-111 #7, of this letter. The Division approves this variance.
4. M-10(9) Structures and Equipment - The operator has requested that all structures and equipment identified in Table 14-1, as having postmine use, remain. The Division cannot grant this approval until the postmine use is verified by the operator.
5. M- 10(12) Revegetation - The operator requests that the plant site, roads and drill pads be exempted from requirements pursuant to the planned postmine land use. The Division will not grant this variance until the postmine land use has been verified.
6. M-10(13) Dams - The operator has requested that the brine storage dam remain intact for later conversion into a freshwater impoundment, pursuant to the planned postmine land use. See section R613-004-111 comment #4, of this letter. The Division will not approve this at this time.

GENERAL QUESTIONS & COMMENTS:

All revisions to the original permit application and the mining and reclamation plan must be formatted to allow direct insertion into the application. Changes in text, figures, tables, maps, etc., should be properly numbered and dated as replacement pages.

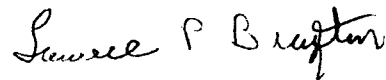
The operator is again advised to proceed with the proposed schedule for conducting the additional studies and generating final designs and reports as outlined in recent correspondence. Upon receipt, the Division will review and respond to the new plans in an expeditious manner.

We would like to meet in early March, with representatives from Moab Salt and BWPC, to discuss these concerns. I or Holland Shepherd, of my staff, will be calling you in the near future to make such arrangements.

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We appreciate your patience and cooperation to date, and look forward to our joint meeting in March.

Sincerely,



Lowell Braxton
Administrator
Mineral Resource Development
and Reclamation Program

HS/jb
Enclosure
cc: Colin P. Christensen, Grand Resource Area, BLM
Don Ostler, Bureau of Water Pollution Control
Mark Page, Division of Water Rights, Price
Minerals Team
MN5/62-70

RESPONSE TO MINING AND RECLAMATION PLAN
DOGM COMMENTS DATED 2/23/89 - ATTACHMENT "A"

We have broken down the remaining concerns, relative to Moab Salt's Mining and Reclamation Plan into several categories. DOGM or BWPC will assume the lead review for each category. The lead agency may receive review input from the other agency during the review process. The first group of concerns refer to those addressed in Attachment A of our January 28, 1988 letter. These follow below:

1. Runoff/Canyon Collection System

DOGM has requested that the operator improve the brine water collection system associated with the evaporation ponds. Both agencies will review and evaluate the operator's design proposals for the improved system.

2. Ground Water Discharge from the Brine Lake

DOGM has asked for an evaluation of subsurface seepage from the Brine Lake along underlying faults and joints. BWPC will assume the lead review for this concern.

3. Water Balance and River Water Quality Monitoring

We have asked Moab Salt for a water balance evaluation for the major elements of the processing system and for the collection of water samples from the Colorado River, both above and below the mine site. BWPC will now assume the lead role in this review with input from DOGM.

4. Catch Pond Below the Brine Lake

BWPC will take the lead in evaluating the adequacy of the catch pond below the Brine Lake Dam, and the adequacy of the grouting procedure of the open joints in the foundation of the reservoir and in the dam; in its evaluation of the Brine Lake (see point 2, above).

5. Landfill Reclamation

The function and reclamation of the proposed landfill will be reviewed by DOGM with input from BWPC.

6. Handling of Storm Water Runoff

Both agencies will evaluate the operator's proposed designs for controlling storm drainage during operations and upon reclamation.

7. Subsidence Monitoring

DOGM will evaluate the operator's proposed subsidence monitoring plan.

8. Reporting

Each agency will specify the necessary reporting information and frequency required.

The following items refer to Attachment B of our January 28, 1988 letter:

1. Soil Reclamation/Test Plots

DOGM will take the lead in evaluating the operator's proposed soil reclamation methodology. We will also be requesting the installation of soil and revegetation test plots. DOGM will help the operator initiate the test plots and subsequently evaluate their success.

2. Soil Reclamation/Salt Removal

DOGM will lead the review, with BWPC input, in evaluating the potential for future contamination from subsurface salts, relative to the operator's proposal of leaching residual salts to a 3-foot subsurface depth.

3. Plant Site Runoff

Both agencies will evaluate mitigating measures to limit salt laden runoff and ground water discharges from the plant site and salt storage area.

4. Plant Site Collection Trench

DOGM will evaluate, with BWPC input, the need for and implementation of a cutoff collection trench to intercept subsurface leachate, down-gradient from the plant site.

5. Ground Water Discharge from the Storage Area

BWPC will take the lead in the evaluation of discharges to ground water from the salt storage area. This will include an assessment of the efficiency of seepage recovery wells TP-1, 2, and 3.

Other issues are as follows:

1. Ground Water Discharges from the Evaporation Ponds

BWPC will take the lead in evaluation of seepage from the evaporation pond. This evaluation may effect the design evaluation of the canyon collection system.

2. Sanitary Wastewater Treatment System

BWPC will take the lead in evaluation of the sanitary wastewater treatment system.

During the February 1st meeting, it was concluded that operator responses to certain plan deficiencies should be addressed by order of importance. The most critical responses would include: 1) the design of the canyon collection system; 2) minimizing the potential surface and ground water contamination from the evaporation ponds, brine lake, and salt storage area; 3) the development of a water balance, and a monitoring system; and 4) postmining land use(s), reclamation and bonding.